

## Testing on weak form efficiency & Volatility of FMCG sector: The evidence from National stock exchange

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**Abstract--** Realizing that stock market is the backbone of our country it is necessary to analyses the weak form efficiency of Indian stock market so as to assess the efficiency of Indian stock market and give suggestions to the investors to make their decisions on their investment. For the purpose of the study, the biggest stock exchange National Stock Exchange has been selected. The study has used the daily adjusted closing price of the stock from 1<sup>st</sup> Apr 2008 to 31<sup>st</sup> Mar 2013 comprising total of six companies form Fast Moving Consumer Goods (FMCG) sector. To test the Market Efficiency the study has used both parametric and non parametric tests like Run Test, Autocorrelation, and Augmented Dickey Fuller test. These tests are used to analyze randomness, independence, stationality for the data collected. To test the volatility E-Garch has been used. The study reveals drifts in market efficiency which offers investors a diversified way to make their investment activities in effective manner.

**Keywords:** *Random Walk Modal, Weak Form Efficiency, Investors, Stock Market, Efficiency of stock market, Investment.*

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### INTRODUCTION

India Financial market is one of the oldest in the world and is considered to be the fastest growing and best among all the markets of the emerging economies. The history of Indian capital markets dates back 200 years toward the end of the 18th century when India was under the rule of the East India Company. The development of the capital market in India concentrated around Mumbai where no less than 200 to 250 securities brokers were active during the second half of the 19th century. The financial market in India today is more developed than many other sectors because it was organized long before with the securities exchanges of Mumbai, Ahmedabad and Kolkata were established as early as the 19th century. Today there are 21 regional securities exchanges in India in addition to the centralized NSE (National Stock Exchange) and OTCEI (Over the Counter Exchange of India). However the stock markets in India remained stagnant due to stringent controls on the market economy that allowed only a handful of monopolies to dominate their respective sectors.

Capital market is one of the significant phases of every financial institution and now it's playing a strategic role in a country's economic growth. Today, Indian market confirms to best international practices and standards both in terms of structure and in terms of operating efficiency. It

facilitates the exchange of funds between company as demander and investor as supplier. These markets channel, the wealth of savers to those who can put it to long-term productive use, such as companies or governments making long-term investments. The existence of capital market enables company to obtain an alternative source of fund. One aspect of capital market conditions that might become consideration before deciding to invest is the market efficiency

### REVIEW OF LITERATURE

**Dr. Ayhan Kapusuzoglu (2013)** examine under Istanbul Stock Exchange (ISE) National 100 index whether weak form market efficiency exists or not under efficiency market hypothesis. For this purpose, daily closing values of the related index during the period from 1996 to 2012 were used as data and 3943 pieces of daily data were provided from ISE. In order to test weak form market efficiency under this study, unit root tests were implemented. First of all, natural logarithms of data were taken before the analysis and then, it was preceded to the analysis. Unit root tests were carried out under models which contain both constant and constant-trend components and in each two tests, it was precipitated that set is stationary at the level (H0 hypothesis rejected). The findings suggest that, it was determined that the related set not shows random walk and in other words,

ISE National 100 market is not an efficient market in weak form.

**Misra Vandna (2012)** tested weak form of efficiency of Indian stock market for the period of 2001-2011. The study offers supportive evidence for rejection of weak form of efficiency in Indian stock market by endorsing absence of randomness and independence in selected return series. It reveals drifts in market efficiency which offers avenues for devising profitable trading strategies to market participants.

**Chien-Ping Chen1 & Massoud Metghalchi (2012)** investigate the predictive power of various trading rules with different combinations of the most popular indicators in technical analysis for the Brazilian stock index (BOVESPA) over the period of 5/1/1996 to 3/1/2011. Although few multiple-indicator trading models show profitability, their predictive power is eliminated after considering the possible interest earning from money market in the days out of stock market. The results support strongly the weak form of market efficiency for the Brazilian stock market.

**K. Venkatesan (2010)** says that the behavior of stock market returns is a central issue to the theory and practice of asset pricing, asset allocation, and risk management. The supporters of the efficient market hypothesis (EMH) claim that stock price indices are basically random and as such any speculation based on past information is fruitless. This paper investigates the Random Walk (RW) behavior of stock market returns of India. The naïve random walk model was estimated using Ordinary Least Squares (OLS) method over the period 1<sup>st</sup> January, 2008 to 31<sup>st</sup> December, 2009. The data are obtained from the National Stock Exchange (NSE) website, Mumbai. The study result reveals that the return series is insignificantly different from zero, which is consistent with the random walk hypothesis. It can be, therefore, the present study suggests that the Indian stock market is found to be efficient and supports the random walk model.

**Rakesh Gupta & Parikshit K. Basu (2007)** tested the weak form efficiency in the framework of random walk hypothesis for the two major equity markets in India for the

period 1991 to 2006. Runs test (Bradley 1968) and LOMAC variance ratio test (Lo and MacKinlay 1988) is used to test the weak form efficiency and random walk hypothesis. The found that the series do not follow random walk model and there is an evidence of autocorrelation in both markets rejecting the weak form efficiency hypothesis.

**Graham smith & Hyun-Jung Ryoo (2003)** tested the stock market price indices follow a random walk is tested for five European emerging markets, Greece, Hungary, Poland, Portugal and Turkey, using the multiple variance ratio test & autocorrelation. The study found that in four of the markets, the random walk hypothesis is rejected because of autocorrelation in returns. For the Istanbul market, which had markedly higher turnover than the other markets in the 1990s, the stock price index follows a random walk.

**Pothupitiyage Narada Damitha Fernando (2012)** probed the efficiency of emerging Colombo stock exchange (CSE) through independence tests and technical trading strategies from January 1985 to December 2010. Employed with autocorrelation test and nonparametric run test to examine the statistical independence of the CSE and moving average trading strategies to test the predictability of the market. The result found that the CSE is not in weak-form efficient

## OBJECTIVES OF THE STUDY

The following are objectives of the study

- To find out whether CNX FMCG stocks are “Weak Form Efficient”
- To analyze the volatility of individual securities
- To give the valuable suggestion for the growth of the investors.

## PERIOD OF THE STUDY

The sample period is 1<sup>st</sup> April 2008 to 3<sup>rd</sup> March 2013. The data consist of daily adjusted return of FMCG sector

## TOOLS FOR ANALYSIS

- Augmented Dickey Fuller test
- Runs Test
- Autocorrelation Test
- E-Garch

**SAMPLE SIZE**

The data was chosen according to constituents by weightage from the CNX FMCG index.

S. No	LIST OF CONSTITUENTS BY WEIGHTAGE COMPANIES
1	I T C LTD.
2	GODREJ CONSUMER PRODUCTS LTD.
3	DABUR INDIA LTD.
4	COLGATE PALMOLIVE (INDIA) LTD.
5	BRITANNIA INDUSTRIES LTD.
6	GLAXOSMITHKLINE CONSUMER HEALTHCARE LTD.

**Table – 1**

**AUGMENTED DICKEY FULLER TEST**

S. No.	Company Name	Augmented Dickey Fuller Test	Probability
1	I T C Ltd	-7.765607	0.0000
2	Godrej Consumer Products Ltd	-8.081538	0.0000
3	Dabur India Ltd	-8.151491	0.0000
4	Colgate Palmolive (India) Ltd	-7.678652	0.0000
5	Britannia Industries Ltd.	-7.743546	0.0000
6	GlaxoSmithKline Consumer Healthcare Ltd	-7.198442	0.0000

**Note:** The significant value at 1%, 5%, 10% for Augmented Dickey Fuller Test are -3.4566, -2.8729 and -2.5729 respectively.

Table -1 has given the test critical value for t-statistics by using Augmented Dickey Fuller (ADF) test for the volatility series. The p-value is less than or equal to a specified significance level, often 0.05 (5%), or 0.01 (1%) and even 0.1 (10%) reject the null hypothesis. The P- Value is 0.000 reject the null hypothesis in all significant. It found that the selected companies are stationary at 1%, 5%, 10%,

but that does not imply that the null hypothesis is true. The data are merely consistent with it.

The other way to see this is that your test statistic is smaller (**in absolute value**) than the critical value. The critical values are -3.546099, -2.911730 and -2.593551. It is found that the ADF test statistic values are less than the Test Critical Values would reject the null hypothesis .So it identifies that the stock price return for the select companies are stationary.

**Table - 2**

**RUN TEST**

S.No	Company Name	N	Z value	Significant value
1	I T C Ltd	33	1.347	0.178
2	Godrej Consumer Products Ltd	29	-0.488	0.625
3	Dabur India Ltd	38	1.921	0.055
4	Colgate Palmolive (India) Ltd	34	0.937	0.349
5	Britannia Industries Ltd.	18	-0.425	0.671
6	GlaxoSmithKline Consumer Healthcare Ltd	28	-0.710	0.477

The table – 2 indicates ran test. It converts the total number of runs into a Z statistics. ITC, Dabur, and Colgate have higher Z value other then these three companies have lower Z value. It shows that Godrej, Britannia, and

GlaxoSmithKline have random distribution in earning return. So it clearly indicates that the companies listed in NSE are random.

**Table – 3**

**AUTOCORRULATION TEST**

Lag	Itc	Godrej	Dabur	Colgate	Britannia	GlaxoSmithkline
1	-.028	-.069	-.075	-.014	-.025	.046
2	-.004	.041	-.115	-.239	-.003	-.023
3	.030	.064	.103	-.028	.002	.168
4	-.029	-.049	-.012	.060	-.041	.044
5	-.029	-.103	.070	-.064	-.048	.003
6	-.075	-.008	-.114	-.006	-.014	-.107
7	-.042	-.115	.032	.083	-.033	-.013
8	.013	-.024	.072	-.181	.004	-.071
9	-.086	-.034	-.096	-.039	.012	-.161
10	.073	-.104	-.067	.055	-.027	-.062
11	.011	.135	.085	.156	-.009	.040
12	-.135	.005	-.028	-.083	-.053	-.052
13	.159	-.040	-.169	-.160	-.054	.023
14	.043	-.022	.003	.145	.011	-.004
15	-.111	-.051	.119	.016	-.024	-.075
16	-.027	-.040	-.057	-.113	-.012	-.041

The above table - 3 reveals the results of autocorrelation of consumer goods price during the study period. It is understood from the above table that out of 16 lag only seven lag has positive in Dabur, six lag positive in ITC, Colgate, and GlaxoSmithkline, four lag positive in Godrej and Dabur

The analysis of autocorrelation in consumer index shows that 6 companies were not significant. It clearly indicated that the companies listed in consumer index are inefficient.

**Table - 4**

**EGARCH**

S. No.	Company Name	Coefficients - EGARCH (1,1)			
		$\alpha_0$	$\alpha_1$	$\beta_1$	$\gamma_1$
1	ITC Ltd	-0.4521 (-545.61)	-1.0217 (-485.88)	0.3163 (112.24)	0.7711 (7814.2)
2	Godrej	0.3252 (0.6771)	-0.1211 (-0.2188)	-0.4242 (-1.8687)	1.0245 (14.685)
3	Dabur	-9.2274 (-4453.56)	0.8431 (4.3691)	0.1579 (176.52)	-0.8497 (-38.473)
4	Colgate	-10.4732 (-34.934)	0.0285 (0.1387)	0.3387 (3.4692)	0.9995 (-15.919)
5	Britannia	-0.0272 (-0.5273)	-1.9588 (-92.2804)	1.4676 (128.29)	0.7742 (64.914)
6	GlaxoSmithKline	-10.9490 (-14.005)	0.5064 (1.5039)	0.2996 (2.1714)	-0.9103 (-11.7752)

$\alpha_0$ : constant in the model represents a long-run average;

$\alpha_1$ : The ARCH term which is the lag of the squared residuals from the mean equation, represents news about Volatility from the previous period;

$\beta_1$ :  $\gamma_1$ - Correlation between the realized volatility and the historical return. (Leverage effect)

From the EGARCH table - 4 it is observed that the return series have shown significance constant coefficient for companies. The long term volatility level of return series indicated through larger coefficient in GARCH equation. The EGARCH coefficients are less than one for all FMCG Companies. It proves that the new shocks will not have an effect on prices for a longer duration. The average value of an ARCH and GARCH effect of all FMCG sector companies were found lesser than one. This clearly indicates that greater persistence of external shocks towards return. Form the above said ARCH effect, the larger coefficient has indicated less reaction of stocks towards other shocks in the market. From the EGARCH table it is observed that, there is a leverage effect for all the FMCG Sector companies. All

the companies were found significant. It proves that, a positive shock has high impact on conditional variance compared to the negative shock.

**FINDINGS**

- Augmented dickey fuller test (ADF) shows that the critical values are -3.546099, -2.911730 and -2.593551. It is found that the ADF test statistic values are less than the Test Critical Values. It indicates that the stock price returns for selected companies are stationary.
- Run Test shows that the Godrej, Britannia, and GlaxoSmithKline have random distribution in earning return.

- Autocorrelation of consumer index shows that 6 companies were not significant. It clearly indicated that the companies listed in consumer index are inefficient.
- Egarch analyses shows the there is no effect in stock price if new stocks are been introduced because the coefficient value of the Garch is lesser then zero.

## CONCLUSION

The results of these tests find that the companies listed in CNX FMCG are not weak form efficient and less volatility. The research has given a clear picture about the market efficiency and occurrence of price volatility in the stock. This gives investors to make their investment in better way to maximize their profit earning capacity. This also helps the investors to predict the price changes in the market. Through this the investors can get idea to make their investment in FMCG sector.

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